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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,219	10/14/2003	Yaw S. Obeng	SILO-0016	4073
27964	7590	04/09/2007		
HITT GAINES P.C. P.O. BOX 832570 RICHARDSON, TX 75083			EXAMINER UMEZ ERONINI, LYNETTE T	
			ART UNIT	PAPER NUMBER
			1765	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/09/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/09/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@hittgaines.com

## Office Action Summary

**Application No.**

10/685,219

**Applicant(s)**

OBENG, YAW S.

**Examiner**

Lynette T. Umez-Eronini

**Art Unit**

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 8-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 8-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (US 6,551,935 B1) in view of Deckert et al. (US 3,874,129) and further in view of Prigge et al. (US 4,968,381).

As to claims 1-3 and 8-11, Sinha discloses a slurry for polishing a copper conductive structure of semiconductor device (Abstract). The slurry comprises at least one oxidizer, inhibitor and one or more abrasives (column 3, lines 11-13). Examples of the oxidizer includes hydrogen, ammonium persulfate, potassium iodate ( $\text{KIO}_3$ ), . . . and mixtures thereof (column 5, lines 34-40); corrosion inhibitors include benzotriazole (BTA), potassium silicate, and mixtures thereof and make up 0.05 % to 2 % by weight of the slurry (column 5, lines 52-66); and abrasive agents include alumina and silicon dioxide ( $\text{SiO}_2$ , same as silica), (column 6, lines 1-3). The slurry can have a pH in the range of 3 to 7 and includes one or more pH control agents or buffers to adjust the pH to a desired level (column 6, lines 6-10). Sinha further teaches a conventional polishing pad or any other pad polishing pad format known in the art that is brought into contact

Art Unit: 1765

with a copper layer and slurry to remove copper (column 4, lines 27-38). The aforementioned reads on,

A slurry for chemical mechanical polishing (CMP) a metal surface of a semiconductor substrate with a polyurethane free thermoplastic foam polishing body, comprising, an acid buffer that maintains said slurry at a pH between about 2.5 and about 4.0 during polishing of a metal surface on a semiconductor substrate, **in claim 1.**

The above aforementioned encompasses,

wherein said pH is between about 2.7 and about 3. 2, **in claim 2;** and

wherein said pH is between about 3.5 and about 4.0, **in claim 3;**

Since Sinha's polishing slurry comprises potassium iodate (same as Applicant's oxidant), then contacting potassium iodate with a metal (Cu) surface that is to be polished, would result the same in the production of a passivation agent, I<sub>2</sub> (column 5, lines 34-40), thereby reading on,

the slurry including an oxidant and a passivation agent, **in claim 8;**

wherein said passivation agent is generated in situ from a reaction between said metal surface and said oxidant, **in claim 9;** and

wherein said oxidant is potassium iodate (KIO<sub>3</sub>) said passivation agent is iodine (I<sub>2</sub>) and said metal surface includes copper, **in claim 10.**

Since Sinha's polishing slurry comprises an oxidizer such as potassium iodate and further includes an inhibitor (copper corrosion inhibitors) component such as BTA, (same as Applicant's second passivation agent), (column 5, lines 6-23 and 52-67), then using Sinha's slurry in the same manner as claimed by Applicant would result the same

Art Unit: 1765

wherein a second passivation agent that is not generated in situ wherein said passivation agent and said second passivation agent synergistically interact with said metal surface to retard corrosion of said metal surface, **in claim 11.**

Sinha differs in failing to teach an abrasive particle stabilizer, wherein said abrasive particle stabilizer comprises molecules that are equivalent to repeating units of polymers comprising abrasive particles in said slurry, **in claim 1;** and

wherein said abrasive particles comprise colloidal silica particles and said abrasive particle stabilizer comprises silicic acid and silicic salt, **in claim 5.**

Deckert discloses, polishing agents containing quartz (same as silica or silicon dioxide), silicic acid, silicates and fluosilicates (same as silicic salt), for chemical polishing in order to obtain smooth surfaces for semiconductors (column 1, lines 4-12). Since the combination of Deckert's silicic acid and silicates is the same as Applicant's stabilizer, then using the said combination in the same manner as claimed by Applicant would result the same wherein said abrasive particle stabilizer comprises molecules that are equivalent to repeating units of polymers comprising abrasive particles in the said slurry.

Hence, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Sinha's polishing agent by employing silicic and silicates, (same as Applicant's stabilizer) as taught by Deckert for the purpose of smoothing surfaces of semiconductors that are to be used as components or starting

materials for the production of electronic parts, e.g., integrated circuits (Deckert, column 1, lines 9-12).

Sinha in view of Deckert differs in failing to teach wherein a ratio of said silicic acid to said silicic salt is between about 100:1 and 1:100, **in claim 1**.

Prigge discloses a polishing solution that contains an additional polishing component containing 1 to 20% by volume of silicic acid or silicates (column 2, lines 5-11) and 1% by volume.

Prigge illustrates a polishing slurry that comprises silica or a silicate salt is known. Hence, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Sinha in view of Deckert by selecting any proportion of (% by volume) of silicic acid or silicates additives in the Prigge reference, including Applicant's specifically claimed ratio of silicic acid and silicic salt because the said combination has been shown to effectively accomplish the disclosed composition in a polishing method (see Prigge, column 2, lines 11-14), in the absence of a teaching of unexpected results.

### ***Response to Arguments***

3. Applicant's arguments filed 1/8/2007 have been fully considered but they are not persuasive. Applicant traverses the rejection of claims 1-3 and 8-11 under 35 U.S.C. §103(a) as being unpatentable over to Sinha et al. (US 6,551,935) in view of Deckert (U.S. 3,874,129). Applicant argues the combination of Sinha in view of Deckert fails to teach or suggest all the elements recited in claim 1 and its dependent claims and is not

Art Unit: 1765

a proper combination and Deckert in view of Sinha and now in view of Prigge (US 4,968,381), fails to teach the limitation, "a ratio of said silicic acid to said silicic salt is between about 100:1 and 1:100, as now recited in Claim 1. Applicants further argue the passage in Prigge (column 2, lines 5-14), which was relied upon to teach the said limitation fails to mention the ratio of silicic acid to silicic salt as taught in the present application, but merely discloses that 1 to 20% vol% of polishing solution can have a polishing sol or gel that is based on silicic acid, or as an alternative, a solid polishing component, with silicate being an example the solid polishing component. Also Applicant argues Prigge's Examples 1-4 uses a silicic acid sol with no mention of the presence of solid polishing components, such as silicates (Prigge, columns 5-6).

Applicant's arguments are acknowledged and unpersuasive because the passage relied upon by Prigge (column 2, lines 5-14) is not limited to solely to the concentration of silicic acid or to silicates. Further, Prigge has illustrated a polishing slurry that comprises additives such as silicic acid or a silicate salt (column 2, lines 5-14) is known. Hence, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Sinha in view of Deckert by selecting any proportion of (% by volume) of silicic acid or silicates in the Prigge reference, including Applicant's specifically claimed ratio of silicic acid and silicic salt because the said combination has been shown to effectively accomplish the disclosed composition in a polishing method of (see Prigge, column 2, lines 11-14), in the absence of a teaching of unexpected results.

***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.



Art Unit: 1765

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Art Unit 1765

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March 26, 2007

Nadine Norton  
Supervisory Patent Examiner  
Art Unit 1765  
